

Discovering More Mathematics and Applications by Integrating CAS with 3D DGS

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Abstract. It is known that the Computer Algebra Systems such as Maple, Mathematica and etc. have provided pivotal role in numeric, algebraic and symbolic computational abilities for our teaching and research. We have also seen the power of 2D Dynamic Geometry Software (DGS) such as Geometers' SketchPad, Cabri II and etc. In this talk, we use examples to demonstrate, from users' point of view, why a 3D DGS will provide us crucial 3D visualizations and a CAS can provide us theoretical verification in teaching, learning and research in mathematics and its applicable fields. It is often the case that research and applications in mathematical fields are originated from real-life problems. In this talk, we use examples to demonstrate with the evolving technological tools, it is also possible to link our mathematics discoveries to areas such as in sciences, technology and engineering. We emphasize the importance of recognizing technological tools as research options. We make our examples accessible for those who have mathematics knowledge up to university level. Invest in mathematics teaching and research in higher education is essential for cultivating innovation and creative thinking skills. While professional trainings in the area of content knowledge for secondary schools (middle or high schools) are important. It is equally important that we promote exploratory activities which allow students to think and solve problems creatively in university levels and beyond.



Professor Dr. Wei-Chi Yang

(www.radford.edu/~wyang) currently is working at the Department of Math and Stats at Radford University, Virginia, USA. He received his B.S. from Taiwan, M.S. and Ph.D. from University of California at Davis.

- His original research was in theoretical Henstock and Kurzweil Integration. Thanks to Computer Algebra System, he has been doing the computational integration based on his theoretical background since 1994.
- He founded the Asian Technology Conference in Mathematics (ATCM: <http://atcm.mathandtech.org>) in 1995, and
- He founded the Electronic Journal of Mathematics and Technology (eJMT: <http://ejmt.mathandtech.org>) in 2007.
- The printed version of eJMT, called the Research Journal of Mathematics and Technology (RJMT: <http://rjmt.mathandtech.org>) was launched by Dr. Yang in June of 2012, a joint project with Beijing Normal University, China.
- He receives the award of the title “Professor honoris causa” on October 21, 2013 by the rector of the Czech University of Life Sciences Prague. Professor Honoris Causa (prof.h.c.) is an honorary title awarding one's outstanding scientific career and dedication to teaching within the recipient's field of study as well as contributions to the development of the recipient's discipline through research, publications, conferences and journals.
- Professor Yang was the recipient of the 2009 Radford University Foundation Distinguished Creative Scholar Award (<http://www.radford.edu/NewsPub/August09/0827awards.html>).
- Dr. Yang was invited to participate and give a talk at the [Paradigms in Mathematical Education for the XXIst Century-Sharing educational experiences with Asia](#), October 22-24, 2009.
- He was interviewed by EduWebTV.com; a Talk show of the official Web TV for the Ministry of Education in Malaysia on May 15, 2009. He talked about the reform of mathematics with technology in the East and the West. The video clip can be found in this link: <http://mathandtech.org/Video.aspx>.
- He had co-authored a book 'Exploring Mathematics with Scientific Notebook', and published numerous journal articles and papers in conference proceedings.
- Professor Yang had traveled to over 30 countries around the world, given over 300 presentations regarding ***the innovative use of technological tools in teaching, learning and research in Mathematics*** since 1992.
- Complete CV can be found at <http://www.radford.edu/wyang/YangWei-Chi.pdf>